# PROJECT MEMORANDUM

DATE: November 23, 1992

TO: Joe Depner, Hydrogeologist

FROM: Nels Cone, Chemist

SUBJECT: DATA VALIDATION OF ANALYTICAL RESULTS FROM PIER 91 RCRA FACILITY INVESTIGATION, PROJECT 624878, DATA SET #2



On September 18, 1992, soil samples were collected for semivolatile (EPA SW-846 Method 8270) and Total Petroleum Hydrocarbon (EPA SW-846 Methods 418.1 and 8015) analyses. On September 21, 1992, the samples were submitted to Sound Analytical Services (SAS) of Tacoma, Washington to perform the requested analyses on the following samples:

CP-HA-8-3-3.5, CP-HA-8-4.5-5, and CP-HA-10-1.5-2

Properly completed chain-of-custody (COC) forms were included, along with documented signatures from field to laboratory receipt. All samples were shown as having been properly iced and received in good condition. All holding times were clearly written and evaluated according to regulatory protocol (*National Functional Guidelines for Organic Data Review*, USEPA, 1990). Samples received the requested analyses, and laboratory extraction/analysis times met well within required guidelines.

Duplicate analyses were performed as required by the Quality Assurance Project Plan (QAPP), and relative percent difference (RPD) between individuals results were shown to be within quality control (QC) guidelines. Method blanks and matrix spike/matrix spike duplicates displayed surrogate recoveries well within required QC limits. Supporting documentation for this data set included raw data, instrument calibration/tuning data, and chromatographic/mass spectral data. Data consistency was demonstrated throughout.

Analytical results from this data set indicate elevated levels of hydrocarbon compounds in all samples tested. These samples required dilution to ensure that target analytes were within the instrument calibration range. As a result, elevated detection limits were reported, and sample surrogate recoveries were outside normal QC limits. Regardless, the data quality objectives as defined in Table F-2 of the QAPP are not compromised.

Proper data qualifier flags accompanied the analytical results as needed, and their use is consistent with USEPA guidelines. Accordingly, this data set can be considered valid for its intended use.

NC/rlk/b41:1889b.mem

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206) 922-2310 - FAX (206) 922-5047



# ANALYTICAL NARRATIVE

Client: Burlington Environmental Engineering

Date: October 22, 1992

Project: 624878 Pier 91

Lab No.: 27253

Delivered by: SAS

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Date Sampled: 09-18-92

Condition of Samples upon Receipt: Samples were received cold and in good condition. Chain-of-custody was in order.

## SAMPLE EXTRACTION AND ANALYSIS

Samples 27253-1 through 27253-3 were analyzed for total petroleum fuel hydrocarbons in accordance with EPA SW-846 Modified Method 8015. The soil samples were extracted on 09-24-92 and analyzed on 09-29-92. Ten-fold dilutions were required prior to analysis due to the high concentration of petroleum hydrocarbons present in both samples. The concentration of petroleum hydrocarbons present in sample 27253-3 exceeded the instrument calibration range. The reported concentration sould be considered an estimated quantity. The surrogate recoveries could not be calculated for these samples due to the required dilutions. All other Quality Control was within acceptable limits.

Samples 27253-1 through 27253-3 were analyzed for total petroleum hydrocarbons in accordance with EPA Method 418.1. The soil samples were extracted and analyzed on 09-23-92. 1:50 dilutions were performed prior to analysis due to the high concentration of petroleum hydrocarbons present in the samples. All Quality Control was within acceptable limits.

Samples 27253-1 through 27253-3 were analyzed for semivolatile organics by GC/MS in accordance with EPA SW-846 Method 8270. The soil samples were extracted on 09-23-92 and analyzed on 09-29-92. The quantitation limits for these samples were elevated due to the high concentrations of non-TCL analytes present in the samples. Batch QC was reported for this sample group. All Quality Control was within acceptable limits.

Results for soil samples were reported on a dry weight basis.

No blank correction was employed.

Data qualifier definitions are attached to the report.

# SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047


Report To: Burlington Environmental Engineering

Date: October 6, 1992

Report On: Analysis of Soil

Lab No.: 27253



IDENTIFICATION:
Samples Received on 09-21-92
Project: 624878 Pier 91

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ANALYSIS:

Lab No. 27253-1

Client ID: CP-HA-8-3-3.5

Semivolatile Organics Per EPA SW-846 Method 8270
Date Extracted: 9-23-92
Date Analyzed: 9-29-92

| CAS No. | Compounds | Concentration ug/kg | PQL |
|---|---|---|---|
| 108-95-2 | Phenol | ND | 7,100 |
| 111-44-4 | bis(2-Chloroethyl) ether | ND | 7,100 |
| 95-57-8 | 2-Chlorophenol | ND | 7,100 |
| 541-73-1 | 1,3-Dichlorobenzene | ND | 7,100 |
| 106-46-7 | 1,4-Dichlorobenzene | ND | 7,100 |
| 100-51-6 | Benzyl Alcohol | ND | 14,000 |
| 95-50-1 | 1,2-Dichlorobenzene | ND | 7,100 |
| 95-48-7 | 2-Methylphenol | ND | 7,100 |
| 39638-32-9 | bis(2-Chloroisopropyl)ether | ND | 7,100 |
| 106-44-5 | 4-Methylphenol | ND | 7,100 |
| 621-64-7 | N-Nitroso-Di-N-propylamine | ND | 7,100 |
| 67-72-1 | Hexachloroethane | ND | 7,100 |
| 98-95-3 | Nitrobenzene | ND | 7,100 |
| 78-59-1 | Isophorone | ND | 7,100 |
| 88-75-5 | 2-Nitrophenol | ND | 7,100 |
| 105-67-9 | 2,4-Dimethylphenol | ND | 7,100 |
| 65-85-0 | Benzoic Acid | ND | 35,000 |
| 111-91-1 | bis(2-Chloroethoxy)methane | ND | 7,100 |
| 120-83-2 | 2,4-Dichlorophenol | ND | 7,100 |
| 120-82-1 | 1,2,4-Trichlorobenzene | ND | 7,100 |
| 91-20-3 | Naphthalene | *(6,000) | 7,100 |
| 106-47-8 | 4-Chloroaniline | ND | 14,000 |
| 87-68-3 | Hexachlorobutadiene | ND | 7,100 |
| 59-50-7 | 4-Chloro-3-methylphenol | ND | 14,000 |

ND - Not Detected

Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992

Lab No. 27253-1 Client ID: CP-HA-8-3-3.5

EPA Method 8270 Continued

| CAS No. | Compounds | Concentration ug/kg | PQL |
|---|---|---|---|
| 91-57-6 | 2-Methylnaphthalene | 29,000 | 7,100 |
| 77-47-4 | Hexachlorocyclopentadiene | ND | 7,100 |
| 88-06-2 | 2,4,6-Trichlorophenol | ND | 7,100 |
| 95-95-4 | 2,4,5-Trichlorophenol | ND | 7,100 |
| 91-58-7 | 2-Chloronaphthalene | ND | 7,100 |
| 88-74-4 | 2-Nitroaniline | ND | 35,000 |
| 131-11-3 | Dimethyl phthalate | ND | 7,100 |
| 208-96-8 | Acenaphthylene | nd | 7,100 |
| 606-20-2 | 2,6-Dinitrotoluene | ND | 7,100 |
| 99-09-2 | 3-Nitroaniline | ND | 35,000 |
| 83-32-9 | Acenaphthene | *(2,100) | 7,100 |
| 51-28-5 | 2,4-Dinitrophenol | ND | 35,000 |
| 100-02-7 | 4-Nitrophenol | ND | 35,000 |
| 132-64-9 | Dibenzofuran | ND | 7,100 |
| 121-14-2 | 2,4-Dinitrotoluene | ND | 7,100 |
| 84-66-2 | Diethylphthalate | ND | 7,100 |
| 7005-72-3 | 4-Chlorophenyl phenyl ether | ND | 7,100 |
| 86-73-7 | Fluorene | *(3,600) | 7,100 |
| 100-01-6 | 4-Nitroaniline | ND | 35,000 |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | ND | 35,000 |
| 86-30-6 | N-Nitrosodiphenylamine | ND | 7,100 |
| 101-55-3 | 4-Bromophenyl phenyl ether | ND | 7,100 |
| 118-74-1 | Hexachlorobenzene | ND | 7,100 |
| 87-86-5 | Pentachlorophenol | ND | 35,000 |
| 85-01-8 | Phenanthrene | 14,000 | 7,100 |
| 120-12-7 | Anthracene | ND | 7,100 |
| 84-74-2 | Di-n-butylphthalate | ND | 7,100 |

ND - Not Detected

Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992

Lab No. 27253-1 Client ID: CP-HA-8-3-3.5

EPA Method 8270 Continued

| CAS No. | Compounds | Concentration ug/kg | PQL |
|---|---|---|---|
| 206-44-0 | Fluoranthene | ND | 7,100 |
| 129-00-0 | Pyrene | *(4,000) | 7,100 |
| 85-68-7 | Butyl benzyl phthalate | ND | 7,100 |
| 91-94-1 | 3,3'-Dichlorobenzidine | ND | 14,000 |
| 56-55-3 | Benzo(a)anthracene | ND | 7,100 |
| 218-01-9 | Chrysene | *(2,100) | 7,100 |
| 117-81-7 | bis(2-ethylhexyl)phthalate | ND | 7,100 |
| 117-84-0 | Di-n-octyl phthalate | ND | 7,100 |
| 205-99-2 | Benzo(b)fluoranthene | ND | 7,100 |
| 207-08-9 | Benzo(k)fluoranthene | ND | 7,100 |
| 50-32-8 | Benzo(a)pyrene | ND | 7,100 |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | ND | 7,100 |
| 53-70-3 | Dibenz(a,h)anthracene | ND | 7,100 |
| 191-24-2 | Benzo(g,h,i)perylene | ND | 7,100 |

ND - Not Detected
PQL - Practical Quantitation Limit - These are the quantitation limits for this sample. This number is based on sample size, matrix and dilution required.
*Compound was detected but below PQL. Value shown is an estimated quantity.
Results are reported on a dry weight basis.

Semi-Volatile Surrogates

| Surrogate Compound | Percent Recovery | Control Limits Water | Soil |
|---|---|---|---|
| Nitrobenzene - $d_5$ | X8 | 35 - 114 | 23 - 120 |
| 2-Fluorobiphenyl | X8 | 43 - 116 | 30 - 115 |
| p-Terphenyl-$d_{14}$ | X8 | 33 - 141 | 18 - 137 |
| Phenol-$d_6$ | X8 | 10 - 94 | 24 - 113 |
| 2-Fluorophenol | X8 | 21 - 100 | 25 - 121 |
| 2,4,6-Tribromophenol | X8 | 10 - 123 | 19 - 122 |

Continued . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992

Lab No. 27253-1 Client ID: CP-HA-8-3-3.5

TPH Per EPA Method 418.1
Date Extracted: 9-23-92
Date Analyzed: 9-23-92

| | |
|---|---|
| Total Petroleum Hydrocarbons, mg/kg | 21,000 |

TPH Per EPA SW-846 Modified Method 8015
Date Extracted: 9-29-92
Date Analyzed: 9-29-92

| | |
|---|---|
| Total Petroleum Fuel Hydrocarbons, mg/kg | 21,000 |

TPH as Aged Gas, Diesel and Heavy Oil

| SURROGATE RECOVERY, % | |
|---|---|
| 1-Chlorooctane | X8 |
| O-Terphenyl | X8 |

Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992

Lab No. 27253-2 Client ID: CP-HA-8-4.5-5

Semivolatile Organics Per EPA SW-846 Method 8270
Date Extracted: 9-23-92
Date Analyzed: 9-29-92

| CAS No. | Compounds | Concentration ug/kg | PQL |
|---|---|---|---|
| 108-95-2 | Phenol | ND | 6,900 |
| 111-44-4 | bis(2-Chloroethyl) ether | ND | 6,900 |
| 95-57-8 | 2-Chlorophenol | ND | 6,900 |
| 541-73-1 | 1,3-Dichlorobenzene | ND | 6,900 |
| 106-46-7 | 1,4-Dichlorobenzene | ND | 6,900 |
| 100-51-6 | Benzyl Alcohol | ND | 14,000 |
| 95-50-1 | 1,2-Dichlorobenzene | ND | 6,900 |
| 95-48-7 | 2-Methylphenol | ND | 6,900 |
| 39638-32-9 | bis(2-Chloroisopropyl)ether | ND | 6,900 |
| 106-44-5 | 4-Methylphenol | ND | 6,900 |
| 621-64-7 | N-Nitroso-Di-N-propylamine | ND | 6,900 |
| 67-72-1 | Hexachloroethane | ND | 6,900 |
| 98-95-3 | Nitrobenzene | ND | 6,900 |
| 78-59-1 | Isophorone | ND | 6,900 |
| 88-75-5 | 2-Nitrophenol | ND | 6,900 |
| 105-67-9 | 2,4-Dimethylphenol | ND | 6,900 |
| 65-85-0 | Benzoic Acid | ND | 35,000 |
| 111-91-1 | bis(2-Chloroethoxy)methane | ND | 6,900 |
| 120-83-2 | 2,4-Dichlorophenol | ND | 6,900 |
| 120-82-1 | 1,2,4-Trichlorobenzene | ND | 6,900 |
| 91-20-3 | Naphthalene | *(5,900) | 6,900 |
| 106-47-8 | 4-Chloroaniline | ND | 14,000 |
| 87-68-3 | Hexachlorobutadiene | ND | 6,900 |
| 59-50-7 | 4-Chloro-3-methylphenol | ND | 14,000 |

ND - Not Detected

Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992

Lab No. 27253-2 Client ID: CP-HA-8-4.5-5

EPA Method 8270 Continued

| CAS No. | Compounds | Concentration ug/kg | PQL |
|---|---|---|---|
| 91-57-6 | 2-Methylnaphthalene | 22,000 | 6,900 |
| 77-47-4 | Hexachlorocyclopentadiene | ND | 6,900 |
| 88-06-2 | 2,4,6-Trichlorophenol | ND | 6,900 |
| 95-95-4 | 2,4,5-Trichlorophenol | ND | 6,900 |
| 91-58-7 | 2-Chloronaphthalene | ND | 6,900 |
| 88-74-4 | 2-Nitroaniline | ND | 35,000 |
| 131-11-3 | Dimethyl phthalate | ND | 6,900 |
| 208-96-8 | Acenaphthylene | ND | 6,900 |
| 606-20-2 | 2,6-Dinitrotoluene | ND | 6,900 |
| 99-09-2 | 3-Nitroaniline | ND | 35,000 |
| 83-32-9 | Acenaphthene | *(1,200) | 6,900 |
| 51-28-5 | 2,4-Dinitrophenol | ND | 35,000 |
| 100-02-7 | 4-Nitrophenol | ND | 35,000 |
| 132-64-9 | Dibenzofuran | ND | 6,900 |
| 121-14-2 | 2,4-Dinitrotoluene | ND | 6,900 |
| 84-66-2 | Diethylphthalate | ND | 6,900 |
| 7005-72-3 | 4-Chlorophenyl phenyl ether | ND | 6,900 |
| 86-73-7 | Fluorene | *(3,300) | 6,900 |
| 100-01-6 | 4-Nitroaniline | ND | 35,000 |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | ND | 35,000 |
| 86-30-6 | N-Nitrosodiphenylamine | ND | 6,900 |
| 101-55-3 | 4-Bromophenyl phenyl ether | ND | 6,900 |
| 118-74-1 | Hexachlorobenzene | ND | 6,900 |
| 87-86-5 | Pentachlorophenol | ND | 35,000 |
| 85-01-8 | Phenanthrene | 12,000 | 6,900 |
| 120-12-7 | Anthracene | ND | 6,900 |
| 84-74-2 | Di-n-butylphthalate | ND | 6,900 |

ND - Not Detected

Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992

Lab No. 27253-2 Client ID: CP-HA-8-4.5-5

EPA Method 8270 Continued

| CAS No. | Compounds | Concentration ug/kg | PQL |
|---|---|---|---|
| 206-44-0 | Fluoranthene | ND | 6,900 |
| 129-00-0 | Pyrene | *(3,000) | 6,900 |
| 85-68-7 | Butyl benzyl phthalate | ND | 6,900 |
| 91-94-1 | 3,3'-Dichlorobenzidine | ND | 14,000 |
| 56-55-3 | Benzo(a)anthracene | ND | 6,900 |
| 218-01-9 | Chrysene | *(3,800) | 6,900 |
| 117-81-7 | bis(2-ethylhexyl)phthalate | ND | 6,900 |
| 117-84-0 | Di-n-octyl phthalate | ND | 6,900 |
| 205-99-2 | Benzo(b)fluoranthene | ND | 6,900 |
| 207-08-9 | Benzo(k)fluoranthene | ND | 6,900 |
| 50-32-8 | Benzo(a)pyrene | ND | 6,900 |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | ND | 6,900 |
| 53-70-3 | Dibenz(a,h)anthracene | ND | 6,900 |
| 191-24-2 | Benzo(g,h,i)perylene | ND | 6,900 |

ND - Not Detected
PQL - Practical Quantitation Limit - These are the quantitation limits for this sample. This number is based on sample size, matrix and dilution required.
*Compound was detected but below PQL. Value shown is an estimated quantity.
Results are reported on a dry weight basis.

Semi-Volatile Surrogates

| Surrogate Compound | Percent Recovery | Control Limits Water | Soil |
|---|---|---|---|
| Nitrobenzene - $d_5$ | X8 | 35 - 114 | 23 - 120 |
| 2-Fluorobiphenyl | X8 | 43 - 116 | 30 - 115 |
| p-Terphenyl-$d_{14}$ | X8 | 33 - 141 | 18 - 137 |
| Phenol-$d_6$ | X8 | 10 - 94 | 24 - 113 |
| 2-Fluorophenol | X8 | 21 - 100 | 25 - 121 |
| 2,4,6-Tribromophenol | X8 | 10 - 123 | 19 - 122 |

Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992

Lab No. 27253-2 Client ID: CP-HA-8-4.5-5

TPH Per EPA Method 418.1
Date Extracted: 9-23-92
Date Analyzed: 9-23-92

| | |
|---|---|
| Total Petroleum Hydrocarbons, mg/kg | 14,000 |

TPH Per EPA SW-846 Modified Method 8015
Date Extracted: 9-29-92
Date Analyzed: 9-29-92

| | |
|---|---|
| Total Petroleum Fuel Hydrocarbons, mg/kg | 18,000 |

TPH as Aged Gas, Diesel and Heavy Oil

| SURROGATE RECOVERY, % | |
|---|---|
| 1-Chlorooctane | X8 |
| O-Terphenyl | X8 |

Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992

Lab No. 27253-3 Client ID: CP-HA-8-3-3.5

Semivolatile Organics Per EPA SW-846 Method 8270
Date Extracted: 9-23-92
Date Analyzed: 9-29-92

| CAS No. | Compounds | Concentration ug/kg | PQL |
|---|---|---|---|
| 108-95-2 | Phenol | ND | 28,000 |
| 111-44-4 | bis(2-Chloroethyl) ether | ND | 28,000 |
| 95-57-8 | 2-Chlorophenol | ND | 28,000 |
| 541-73-1 | 1,3-Dichlorobenzene | ND | 28,000 |
| 106-46-7 | 1,4-Dichlorobenzene | ND | 28,000 |
| 100-51-6 | Benzyl Alcohol | ND | 57,000 |
| 95-50-1 | 1,2-Dichlorobenzene | ND | 28,000 |
| 95-48-7 | 2-Methylphenol | ND | 28,000 |
| 39638-32-9 | bis(2-Chloroisopropyl)ether | ND | 28,000 |
| 106-44-5 | 4-Methylphenol | ND | 28,000 |
| 621-64-7 | N-Nitroso-Di-N-propylamine | ND | 28,000 |
| 67-72-1 | Hexachloroethane | ND | 28,000 |
| 98-95-3 | Nitrobenzene | ND | 28,000 |
| 78-59-1 | Isophorone | ND | 28,000 |
| 88-75-5 | 2-Nitrophenol | ND | 28,000 |
| 105-67-9 | 2,4-Dimethylphenol | ND | 28,000 |
| 65-85-0 | Benzoic Acid | ND | 140,000 |
| 111-91-1 | bis(2-Chloroethoxy)methane | ND | 28,000 |
| 120-83-2 | 2,4-Dichlorophenol | ND | 28,000 |
| 120-82-1 | 1,2,4-Trichlorobenzene | ND | 28,000 |
| 91-20-3 | Naphthalene | *(9,500) | 28,000 |
| 106-47-8 | 4-Chloroaniline | ND | 57,000 |
| 87-68-3 | Hexachlorobutadiene | ND | 28,000 |
| 59-50-7 | 4-Chloro-3-methylphenol | ND | 57,000 |

ND - Not Detected

Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992

Lab No. 27253-3 Client ID: CP-HA-8-3-3.5

EPA Method 8270 Continued

| CAS No. | Compounds | Concentration ug/kg | PQL |
|---|---|---|---|
| 91-57-6 | 2-Methylnaphthalene | ND | 28,000 |
| 77-47-4 | Hexachlorocyclopentadiene | ND | 28,000 |
| 88-06-2 | 2,4,6-Trichlorophenol | ND | 28,000 |
| 95-95-4 | 2,4,5-Trichlorophenol | ND | 28,000 |
| 91-58-7 | 2-Chloronaphthalene | ND | 28,000 |
| 88-74-4 | 2-Nitroaniline | ND | 140,000 |
| 131-11-3 | Dimethyl phthalate | ND | 28,000 |
| 208-96-8 | Acenaphthylene | ND | 28,000 |
| 606-20-2 | 2,6-Dinitrotoluene | ND | 28,000 |
| 99-09-2 | 3-Nitroaniline | ND | 140,000 |
| 83-32-9 | Acenaphthene | ND | 28,000 |
| 51-28-5 | 2,4-Dinitrophenol | ND | 140,000 |
| 100-02-7 | 4-Nitrophenol | ND | 140,000 |
| 132-64-9 | Dibenzofuran | ND | 28,000 |
| 121-14-2 | 2,4-Dinitrotoluene | ND | 28,000 |
| 84-66-2 | Diethylphthalate | ND | 28,000 |
| 7005-72-3 | 4-Chlorophenyl phenyl ether | ND | 28,000 |
| 86-73-7 | Fluorene | ND | 28,000 |
| 100-01-6 | 4-Nitroaniline | ND | 140,000 |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | ND | 140,000 |
| 86-30-6 | N-Nitrosodiphenylamine | ND | 28,000 |
| 101-55-3 | 4-Bromophenyl phenyl ether | ND | 28,000 |
| 118-74-1 | Hexachlorobenzene | ND | 28,000 |
| 87-86-5 | Pentachlorophenol | ND | 140,000 |
| 85-01-8 | Phenanthrene | *(4,800) | 28,000 |
| 120-12-7 | Anthracene | ND | 28,000 |
| 84-74-2 | Di-n-butylphthalate | ND | 28,000 |

ND - Not Detected

Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992

Lab No. 27253-3 Client ID: CP-HA-8-3-3.5

EPA Method 8270 Continued

| CAS No. | Compounds | Concentration ug/kg | PQL |
|---|---|---|---|
| 206-44-0 | Fluoranthene | ND | 28,000 |
| 129-00-0 | Pyrene | *(4,200) | 28,000 |
| 85-68-7 | Butyl benzyl phthalate | ND | 28,000 |
| 91-94-1 | 3,3'-Dichlorobenzidine | ND | 57,000 |
| 56-55-3 | Benzo(a)anthracene | ND | 28,000 |
| 218-01-9 | Chrysene | ND | 28,000 |
| 117-81-7 | bis(2-ethylhexyl)phthalate | ND | 28,000 |
| 117-84-0 | Di-n-octyl phthalate | ND | 28,000 |
| 205-99-2 | Benzo(b)fluoranthene | ND | 28,000 |
| 207-08-9 | Benzo(k)fluoranthene | ND | 28,000 |
| 50-32-8 | Benzo(a)pyrene | ND | 28,000 |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | ND | 28,000 |
| 53-70-3 | Dibenz(a,h)anthracene | ND | 28,000 |
| 191-24-2 | Benzo(g,h,i)perylene | ND | 28,000 |

ND - Not Detected
PQL - Practical Quantitation Limit - These are the quantitation limits for this sample. This number is based on sample size, matrix and dilution required.
*Compound was detected but below PQL. Value shown is an estimated quantity.
Results are reported on a dry weight basis.

Semi-Volatile Surrogates

| Surrogate Compound | Percent Recovery | Control Limits Water | Soil |
|---|---|---|---|
| Nitrobenzene - $d_5$ | X8 | 35 - 114 | 23 - 120 |
| 2-Fluorobiphenyl | X8 | 43 - 116 | 30 - 115 |
| p-Terphenyl-$d_{14}$ | X8 | 33 - 141 | 18 - 137 |
| Phenol-$d_6$ | X8 | 10 - 94 | 24 - 113 |
| 2-Fluorophenol | X8 | 21 - 100 | 25 - 121 |
| 2,4,6-Tribromophenol | X8 | 10 - 123 | 19 - 122 |

Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992

Lab No. 27253-3 Client ID: CP-HA-8-3-3.5

TPH Per EPA Method 418.1
Date Extracted: 9-23-92
Date Analyzed: 9-23-92

| | | |
|---|---|---|
| Total Petroleum Hydrocarbons, mg/kg | 26,000 | |

TPH Per EPA SW-846 Modified Method 8015
Date Extracted: 9-29-92
Date Analyzed: 9-29-92

| | | |
|---|---|---|
| Total Petroleum Fuel Hydrocarbons, mg/kg | 51,000 | E |

TPH as Aged Gas, Diesel and Heavy Oil

| SURROGATE RECOVERY, % | |
|---|---|
| 1-Chlorooctane | X8 |
| O-Terphenyl | X8 |

SOUND ANALYTICAL SERVICES

Dennis L. Bean

DENNIS L. BEAN

# SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206) 922-2310 - FAX (206) 922-5047


## QUALITY CONTROL REPORT

TPH by Method 418.1

Client: Burlington Environmental Engineering
Lab No: 27253qc1
Matrix: Soil
Units: mg/kg
Date: October 6, 1992

### DUPLICATE

Dup No. 27253-1

| Parameter | Sample(S) | Duplicate(D) | RPD |
|---|---|---|---|
| Total Petroleum Hydrocarbons | 21,000 | 24,000 | 13.3 |

RPD = Relative Percent Difference
= [(S - D) / ((S + D) / 2] x 100

### METHOD BLANK

| Parameter | Blank Value |
|---|---|
| Total Petroleum Hydrocarbons | < 10 |

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SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

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## QUALITY CONTROL REPORT

Total Petroleum Fuel Hydrocarbons by Method 8015

Client: Burlington Environmental
Lab No: 27253qc2
Units: mg/kg
Date: October 6, 1992

### METHOD BLANK

| Parameter | Blank Value |
|---|---|
| Total Petroleum Fuel Hydrocarbons | < 10 |
| SURROGATE RECOVERY% | |
| 1-chlorooctane | 111 |
| o-terphenyl | 113 |

# SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047


## QUALITY CONTROL REPORT

### SEMIVOLATILE ORGANICS PER EPA SW-846 METHOD 8270



Client: Burlington Environmental Engineering
Lab No: 27253qc3
Units: ug/kg
Date: October 6, 1992
Blank No: S6248

METHOD BLANK

| Compound | Blank Value | PQL |
|---|---|---|
| Phenol | ND | 330 |
| bis(2-Chloroethyl) ether | ND | 330 |
| 2-Chlorophenol | ND | 330 |
| 1,3-Dichlorobenzene | ND | 330 |
| 1,4-Dichlorobenzene | ND | 330 |
| Benzyl Alcohol | ND | 670 |
| 1,2-Dichlorobenzene | ND | 330 |
| 2-Methylphenol | ND | 330 |
| bis(2-Chloroisopropyl)ether | ND | 330 |
| 4-Methylphenol | ND | 330 |
| N-Nitroso-Di-N-propylamine | ND | 330 |
| Hexachloroethane | ND | 330 |
| Nitrobenzene | ND | 330 |
| Isophorone | ND | 330 |
| 2-Nitrophenol | ND | 330 |
| 2,4-Dimethylphenol | ND | 330 |
| Benzoic Acid | ND | 1,700 |
| bis(2-Chloroethoxy)methane | ND | 330 |
| 2,4-Dichlorophenol | ND | 330 |
| 1,2,4-Trichlorobenzene | ND | 330 |
| Naphthalene | ND | 330 |
| 4-Chloroaniline | ND | 670 |
| Hexachlorobutadiene | ND | 330 |
| 4-Chloro-3-methylphenol | ND | 670 |
| 2-Methylnaphthalene | ND | 330 |
| Hexachlorocyclopentadiene | ND | 330 |
| 2,4,6-Trichlorophenol | ND | 330 |
| 2,4,5-Trichlorophenol | ND | 330 |
| 2-Chloronaphthalene | ND | 330 |
| 2-Nitroaniline | ND | 1,700 |
| Dimethyl phthalate | ND | 330 |
| Acenaphthylene | ND | 330 |

Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

SEMIVOLATILE ORGANICS PER EPA SW-846 METHOD 8270



Client: Burlington Environmental Engineering
Lab No: 27253qc3
Units: ug/kg
Date: October 6, 1992
Blank No: S6248

METHOD BLANK

| Compound | Blank Value | PQL |
|---|---|---|
| 3-Nitroaniline | ND | 1,700 |
| Acenaphthene | ND | 330 |
| 2,4-Dinitrophenol | ND | 1,700 |
| 4-Nitrophenol | ND | 1,700 |
| Dibenzofuran | ND | 330 |
| 2,4-Dinitrotoluene | ND | 330 |
| 2,4-Dinitrotoluene | ND | 330 |
| 2,6-Dinitrotoluene | ND | 330 |
| Diethylphthalate | ND | 330 |
| 4-Chlorophenyl phenyl ether | ND | 330 |
| Fluorene | ND | 330 |
| 4-Nitroaniline | ND | 1,700 |
| 4,6-Dinitro-2-methylphenol | ND | 1,700 |
| N-Nitrosodiphenylamine | ND | 330 |
| 4-Bromophenyl phenyl ether | ND | 330 |
| Hexachlorobenzene | ND | 330 |
| Pentachlorophenol | ND | 1,700 |
| Phenanthrene | ND | 330 |
| Anthracene | ND | 330 |
| Di-n-butylphthalate | 580 | 330 |
| Fluoranthene | ND | 330 |
| Pyrene | ND | 330 |
| Butyl benzyl phthalate | ND | 330 |
| 3,3'-Dichlorobenzidine | ND | 670 |
| Benzo(a)anthracene | ND | 330 |
| bis(2-ethylhexyl)phthalate | ND | 330 |
| Chrysene | ND | 330 |
| Di-n-octyl phthalate | ND | 330 |
| Benzo(b)fluoranthene | ND | 330 |
| Benzo(k)fluoranthene | ND | 330 |
| Benzo(a)pyrene | ND | 330 |
| Indeno(1,2,3-cd)pyrene | ND | 330 |
| Dibenz(a,h)anthracene | ND | 330 |
| Benzo(g,h,i)perylene | ND | 330 |

Continued. . . . .

# SOUND ANALYTICAL SERVICES, INC.

## QUALITY CONTROL REPORT

SEMIVOLATILE ORGANICS PER EPA SW-846 METHOD 8270



Client: Burlington Environmental Engineering
Lab No: 27253qc3
Units: ug/kg
Date: October 6, 1992
Blank No: S6248

ND = Not Detected.

PQL = Practical Quantitation Limit - These are the detection limits for this sample. This number is based on sample size, matrix and dilution required.

SEMIVOLATILE SURROGATES

| Surrogate | Percent Recovery | Control Limits Water | Soil |
|---|---|---|---|
| Nitrobenzene - d5 | 82 | 35 - 114 | 23 - 120 |
| 2-Fluorobiphenyl | 70 | 43 - 116 | 30 - 115 |
| p-Terphenyl-d14 | 69 | 33 - 141 | 18 - 137 |
| Phenol-d6 | 79 | 10 - 94 | 24 - 113 |
| 2-Fluorophenol | 86 | 21 - 100 | 25 - 121 |
| 2,4,6-TBP | 83 | 10 - 123 | 19 - 122 |

# SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206) 922-2310 - FAX (206) 922-5047


## DATA QUALIFIER FLAGS

ND: Indicates that the analyte was analyzed for but was not detected. The associated numerical value is the practical quantitation limit, corrected for sample dilution.

J: The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.

C: The identification of this analyte was confirmed by GC/MS.

B: This analyte was also detected in the associated method blank. There is a possibility of blank contamination.

E: The concentration of this analyte exceeded the instrument calibration range.

D: The reported result for this analyte is calculated based on a secondary dilution factor.

A: This TIC is a suspected aldol-condensation product.

M: Quantitation Limits are elevated due to matrix interferences.

S: The calibration quality control criteria for this compound were not met. The reported concentration should be considered an estimated quantity.

X1: Contaminant does not appear to be "typical" product. Elution pattern suggests it may be _____.

X2: Contaminant does not appear to be "typical" product. Further testing is suggested for identification.

X3: Identification and quantification of peaks was complicated by matrix interference; GC/MS confirmation is recommended.

X4: RPD for duplicates outside QC limits. Sample was re-analyzed with similar results. Sample matrix is nonhomogeneous.

X4a: RPD for duplicates outside QC limits due to analyte concentration near the method practical quantitation limit/detection limit.

X5: Matrix spike was diluted out during analysis.

X6: Recovery of matrix spike outside QC limits. Sample was re-analyzed with similar results.

X7: Recovery of matrix spike outside QC limits. Matrix interference is indicated by blank spike recovery data.

X8: Surrogate was diluted out during analysis.

X9: Surrogate recovery outside QC limits due to matrix composition.

X10: Surrogate recovery outside QC limits due to high contaminant levels.

BURLINGTON ENVIRONMENTAL

210 West Sand Bank Road
P.O. Box 330
Columbia, IL 62236-0330
618/281-7173
618/281-5120 FAX

# CHAIN-OF-CUSTODY RECORD

C.O.C. SERIAL NO. 6064

PROJECT NAME PIER 91
PROJECT NUMBER 624.078 MAJOR TASK 7031
SAMPLERS J. Perle
LAB DESTINATION SOUND ANALYTICAL

| SAMPLE NO. | DATE | TIME | COMP | GRAB | SAMPLE LOCATION | NO. OF CONTAINERS | TYPE OF ANALYSIS: TPH 8015 | TPH 418.1 | BNA | | | | | PRESERVATIVES: ICED | PRESERVATIVES: CHEMICALS ADDED | REMARKS (CHEMICAL ANALYSIS REQUEST FORM NUMBER IF APPLICABLE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 9-18 | 1315 | | X | CP-HA-8-3-3.5 | 1 | X | X | X | | | | | X | | |
| | ↓ | 1325 | | X | CP-HA-8-4.5-5 | 1 | X | X | X | | | | | X | | |
| | ↓ | 1115 | | X | CP-HA-10-1.5-2 | 1 | X | X | X | | | | | X | | |
| | | | | | | | | | | | | | | | | |
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| RELINQUISHED BY SIGNATURE | DATE | TIME | RECEIVED BY SIGNATURE | DATE | TIME |
|---|---|---|---|---|---|
| [signature] | 9-21 | 1045 | [signature] | 9/21 | 10:45A |
| [signature] | 9/21 | 13:30 | [signature] SPS | 9/21/92 | 1330pm |
| | | | | | |
| | | | | | |

SHIPPING NOTES

LAB NOTES

BE-34 (1/92)

# SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047



RECEIVED
OCT 19 1992
Burlington Environmental Inc.
Technical Services


Report To: Burlington Environmental Engineering
Date: October 6, 1992
Revised: October 14, 1992

Report On: Analysis of Soil
Lab No.: 27253
Page 1 of 12

IDENTIFICATION:
Samples Received on 09-21-92
Project: 624878 Pier 91

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ANALYSIS:

Lab No. 27253-1
Client ID: CP-HA-8-3-3.5

Semivolatile Organics Per EPA SW-846 Method 8270
Date Extracted: 9-23-92
Date Analyzed: 9-29-92

| CAS No. | Compounds | Concentration ug/kg | PQL |
|---|---|---|---|
| 108-95-2 | Phenol | ND | 7,100 |
| 111-44-4 | bis(2-Chloroethyl) ether | ND | 7,100 |
| 95-57-8 | 2-Chlorophenol | ND | 7,100 |
| 541-73-1 | 1,3-Dichlorobenzene | ND | 7,100 |
| 106-46-7 | 1,4-Dichlorobenzene | ND | 7,100 |
| 100-51-6 | Benzyl Alcohol | ND | 14,000 |
| 95-50-1 | 1,2-Dichlorobenzene | ND | 7,100 |
| 95-48-7 | 2-Methylphenol | ND | 7,100 |
| 39638-32-9 | bis(2-Chloroisopropyl)ether | ND | 7,100 |
| 106-44-5 | 4-Methylphenol | ND | 7,100 |
| 621-64-7 | N-Nitroso-Di-N-propylamine | ND | 7,100 |
| 67-72-1 | Hexachloroethane | ND | 7,100 |
| 98-95-3 | Nitrobenzene | ND | 7,100 |
| 78-59-1 | Isophorone | ND | 7,100 |
| 88-75-5 | 2-Nitrophenol | ND | 7,100 |
| 105-67-9 | 2,4-Dimethylphenol | ND | 7,100 |
| 65-85-0 | Benzoic Acid | ND | 35,000 |
| 111-91-1 | bis(2-Chloroethoxy)methane | ND | 7,100 |
| 120-83-2 | 2,4-Dichlorophenol | ND | 7,100 |
| 120-82-1 | 1,2,4-Trichlorobenzene | ND | 7,100 |
| 91-20-3 | Naphthalene | *(6,000) | 7,100 |
| 106-47-8 | 4-Chloroaniline | ND | 14,000 |
| 87-68-3 | Hexachlorobutadiene | ND | 7,100 |
| 59-50-7 | 4-Chloro-3-methylphenol | ND | 14,000 |

ND - Not Detected


Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992
Revised: October 14, 1992

Lab No. 27253-1 Client ID: CP-HA-8-3-3.5

EPA Method 8270 Continued

| CAS No. | Compounds | Concentration ug/kg | PQL |
|---|---|---|---|
| 91-57-6 | 2-Methylnaphthalene | 29,000 | 7,100 |
| 77-47-4 | Hexachlorocyclopentadiene | ND | 7,100 |
| 88-06-2 | 2,4,6-Trichlorophenol | ND | 7,100 |
| 95-95-4 | 2,4,5-Trichlorophenol | ND | 7,100 |
| 91-58-7 | 2-Chloronaphthalene | ND | 7,100 |
| 88-74-4 | 2-Nitroaniline | ND | 35,000 |
| 131-11-3 | Dimethyl phthalate | ND | 7,100 |
| 208-96-8 | Acenaphthylene | nd | 7,100 |
| 606-20-2 | 2,6-Dinitrotoluene | ND | 7,100 |
| 99-09-2 | 3-Nitroaniline | ND | 35,000 |
| 83-32-9 | Acenaphthene | *(2,100) | 7,100 |
| 51-28-5 | 2,4-Dinitrophenol | ND | 35,000 |
| 100-02-7 | 4-Nitrophenol | ND | 35,000 |
| 132-64-9 | Dibenzofuran | ND | 7,100 |
| 121-14-2 | 2,4-Dinitrotoluene | ND | 7,100 |
| 84-66-2 | Diethylphthalate | ND | 7,100 |
| 7005-72-3 | 4-Chlorophenyl phenyl ether | ND | 7,100 |
| 86-73-7 | Fluorene | *(3,600) | 7,100 |
| 100-01-6 | 4-Nitroaniline | ND | 35,000 |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | ND | 35,000 |
| 86-30-6 | N-Nitrosodiphenylamine | ND | 7,100 |
| 101-55-3 | 4-Bromophenyl phenyl ether | ND | 7,100 |
| 118-74-1 | Hexachlorobenzene | ND | 7,100 |
| 87-86-5 | Pentachlorophenol | ND | 35,000 |
| 85-01-8 | Phenanthrene | 14,000 | 7,100 |
| 120-12-7 | Anthracene | ND | 7,100 |
| 84-74-2 | Di-n-butylphthalate | ND | 7,100 |

ND - Not Detected

Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992
Revised: October 14, 1992

Lab No. 27253-1 Client ID: CP-HA-8-3-3.5

EPA Method 8270 Continued

| CAS No. | Compounds | Concentration ug/kg | PQL |
|---|---|---|---|
| 206-44-0 | Fluoranthene | ND | 7,100 |
| 129-00-0 | Pyrene | *(4,000) | 7,100 |
| 85-68-7 | Butyl benzyl phthalate | ND | 7,100 |
| 91-94-1 | 3,3'-Dichlorobenzidine | ND | 14,000 |
| 56-55-3 | Benzo(a)anthracene | ND | 7,100 |
| 218-01-9 | Chrysene | *(2,100) | 7,100 |
| 117-81-7 | bis(2-ethylhexyl)phthalate | ND | 7,100 |
| 117-84-0 | Di-n-octyl phthalate | ND | 7,100 |
| 205-99-2 | Benzo(b)fluoranthene | ND | 7,100 |
| 207-08-9 | Benzo(k)fluoranthene | ND | 7,100 |
| 50-32-8 | Benzo(a)pyrene | ND | 7,100 |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | ND | 7,100 |
| 53-70-3 | Dibenz(a,h)anthracene | ND | 7,100 |
| 191-24-2 | Benzo(g,h,i)perylene | ND | 7,100 |

ND - Not Detected
PQL - Practical Quantitation Limit - These are the quantitation limits for this sample. This number is based on sample size, matrix and dilution required.
*Compound was detected but below PQL. Value shown is an estimated quantity.
Results are reported on a dry weight basis.

Semi-Volatile Surrogates

| Surrogate Compound | Percent Recovery | Control Limits Water | Soil |
|---|---|---|---|
| Nitrobenzene - $d_5$ | X8 | 35 - 114 | 23 - 120 |
| 2-Fluorobiphenyl | X8 | 43 - 116 | 30 - 115 |
| p-Terphenyl-$d_{14}$ | X8 | 33 - 141 | 18 - 137 |
| Phenol-$d_6$ | X8 | 10 - 94 | 24 - 113 |
| 2-Fluorophenol | X8 | 21 - 100 | 25 - 121 |
| 2,4,6-Tribromophenol | X8 | 10 - 123 | 19 - 122 |

Continued . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992
Revised: October 14, 1992

Lab No. 27253-1 Client ID: CP-HA-8-3-3.5

TPH Per EPA Method 418.1
Date Extracted: 9-23-92
Date Analyzed: 9-23-92

| | |
|---|---|
| Total Petroleum Hydrocarbons, mg/kg | 21,000 |

TPH Per EPA SW-846 Modified Method 8015
Date Extracted: 9-29-92
Date Analyzed: 9-29-92

| | |
|---|---|
| Total Petroleum Fuel Hydrocarbons, mg/kg | 21,000 |

TPH as Aged Gas, Diesel and Heavy Oil

| SURROGATE RECOVERY, % | |
|---|---|
| 1-Chlorooctane | X8 |
| O-Terphenyl | X8 |

Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992
Revised: October 14, 1992

Lab No. 27253-2 Client ID: CP-HA-8-4.5-5

Semivolatile Organics Per EPA SW-846 Method 8270
Date Extracted: 9-23-92
Date Analyzed: 9-29-92

| CAS No. | Compounds | Concentration ug/kg | PQL |
|---|---|---|---|
| 108-95-2 | Phenol | ND | 6,900 |
| 111-44-4 | bis(2-Chloroethyl) ether | ND | 6,900 |
| 95-57-8 | 2-Chlorophenol | ND | 6,900 |
| 541-73-1 | 1,3-Dichlorobenzene | ND | 6,900 |
| 106-46-7 | 1,4-Dichlorobenzene | ND | 6,900 |
| 100-51-6 | Benzyl Alcohol | ND | 14,000 |
| 95-50-1 | 1,2-Dichlorobenzene | ND | 6,900 |
| 95-48-7 | 2-Methylphenol | ND | 6,900 |
| 39638-32-9 | bis(2-Chloroisopropyl)ether | ND | 6,900 |
| 106-44-5 | 4-Methylphenol | ND | 6,900 |
| 621-64-7 | N-Nitroso-Di-N-propylamine | ND | 6,900 |
| 67-72-1 | Hexachloroethane | ND | 6,900 |
| 98-95-3 | Nitrobenzene | ND | 6,900 |
| 78-59-1 | Isophorone | ND | 6,900 |
| 88-75-5 | 2-Nitrophenol | ND | 6,900 |
| 105-67-9 | 2,4-Dimethylphenol | ND | 6,900 |
| 65-85-0 | Benzoic Acid | ND | 35,000 |
| 111-91-1 | bis(2-Chloroethoxy)methane | ND | 6,900 |
| 120-83-2 | 2,4-Dichlorophenol | ND | 6,900 |
| 120-82-1 | 1,2,4-Trichlorobenzene | ND | 6,900 |
| 91-20-3 | Naphthalene | *(5,900) | 6,900 |
| 106-47-8 | 4-Chloroaniline | ND | 14,000 |
| 87-68-3 | Hexachlorobutadiene | ND | 6,900 |
| 59-50-7 | 4-Chloro-3-methylphenol | ND | 14,000 |

ND - Not Detected

Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992
Revised: October 14, 1992

Lab No. 27253-2 Client ID: CP-HA-8-4.5-5

EPA Method 8270 Continued

| CAS No. | Compounds | Concentration ug/kg | PQL |
|---|---|---|---|
| 91-57-6 | 2-Methylnaphthalene | 22,000 | 6,900 |
| 77-47-4 | Hexachlorocyclopentadiene | ND | 6,900 |
| 88-06-2 | 2,4,6-Trichlorophenol | ND | 6,900 |
| 95-95-4 | 2,4,5-Trichlorophenol | ND | 6,900 |
| 91-58-7 | 2-Chloronaphthalene | ND | 6,900 |
| 88-74-4 | 2-Nitroaniline | ND | 35,000 |
| 131-11-3 | Dimethyl phthalate | ND | 6,900 |
| 208-96-8 | Acenaphthylene | ND | 6,900 |
| 606-20-2 | 2,6-Dinitrotoluene | ND | 6,900 |
| 99-09-2 | 3-Nitroaniline | ND | 35,000 |
| 83-32-9 | Acenaphthene | *(1,200) | 6,900 |
| 51-28-5 | 2,4-Dinitrophenol | ND | 35,000 |
| 100-02-7 | 4-Nitrophenol | ND | 35,000 |
| 132-64-9 | Dibenzofuran | ND | 6,900 |
| 121-14-2 | 2,4-Dinitrotoluene | ND | 6,900 |
| 84-66-2 | Diethylphthalate | ND | 6,900 |
| 7005-72-3 | 4-Chlorophenyl phenyl ether | ND | 6,900 |
| 86-73-7 | Fluorene | *(3,300) | 6,900 |
| 100-01-6 | 4-Nitroaniline | ND | 35,000 |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | ND | 35,000 |
| 86-30-6 | N-Nitrosodiphenylamine | ND | 6,900 |
| 101-55-3 | 4-Bromophenyl phenyl ether | ND | 6,900 |
| 118-74-1 | Hexachlorobenzene | ND | 6,900 |
| 87-86-5 | Pentachlorophenol | ND | 35,000 |
| 85-01-8 | Phenanthrene | 12,000 | 6,900 |
| 120-12-7 | Anthracene | ND | 6,900 |
| 84-74-2 | Di-n-butylphthalate | ND | 6,900 |

ND - Not Detected

Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992
Revised: October 14, 1992

Lab No. 27253-2 Client ID: CP-HA-8-4.5-5

EPA Method 8270 Continued

| CAS No. | Compounds | Concentration ug/kg | PQL |
|---|---|---|---|
| 206-44-0 | Fluoranthene | ND | 6,900 |
| 129-00-0 | Pyrene | *(3,000) | 6,900 |
| 85-68-7 | Butyl benzyl phthalate | ND | 6,900 |
| 91-94-1 | 3,3'-Dichlorobenzidine | ND | 14,000 |
| 56-55-3 | Benzo(a)anthracene | ND | 6,900 |
| 218-01-9 | Chrysene | *(3,800) | 6,900 |
| 117-81-7 | bis(2-ethylhexyl)phthalate | ND | 6,900 |
| 117-84-0 | Di-n-octyl phthalate | ND | 6,900 |
| 205-99-2 | Benzo(b)fluoranthene | ND | 6,900 |
| 207-08-9 | Benzo(k)fluoranthene | ND | 6,900 |
| 50-32-8 | Benzo(a)pyrene | ND | 6,900 |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | ND | 6,900 |
| 53-70-3 | Dibenz(a,h)anthracene | ND | 6,900 |
| 191-24-2 | Benzo(g,h,i)perylene | ND | 6,900 |

ND - Not Detected
PQL - Practical Quantitation Limit - These are the quantitation limits for this sample. This number is based on sample size, matrix and dilution required.
*Compound was detected but below PQL. Value shown is an estimated quantity.
Results are reported on a dry weight basis.

Semi-Volatile Surrogates

| Surrogate Compound | Percent Recovery | Control Limits Water | Soil |
|---|---|---|---|
| Nitrobenzene - $d_5$ | X8 | 35 - 114 | 23 - 120 |
| 2-Fluorobiphenyl | X8 | 43 - 116 | 30 - 115 |
| p-Terphenyl-$d_{14}$ | X8 | 33 - 141 | 18 - 137 |
| Phenol-$d_6$ | X8 | 10 - 94 | 24 - 113 |
| 2-Fluorophenol | X8 | 21 - 100 | 25 - 121 |
| 2,4,6-Tribromophenol | X8 | 10 - 123 | 19 - 122 |

Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992
Revised: October 14, 1992

Lab No. 27253-2 Client ID: CP-HA-8-4.5-5

TPH Per EPA Method 418.1
Date Extracted: 9-23-92
Date Analyzed: 9-23-92

| | |
|---|---|
| Total Petroleum Hydrocarbons, mg/kg | 14,000 |

TPH Per EPA SW-846 Modified Method 8015
Date Extracted: 9-29-92
Date Analyzed: 9-29-92

| | |
|---|---|
| Total Petroleum Fuel Hydrocarbons, mg/kg | 18,000 |

TPH as Aged Gas, Diesel and Heavy Oil

| SURROGATE RECOVERY, % | |
|---|---|
| 1-Chlorooctane | X8 |
| O-Terphenyl | X8 |

Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992
Revised: October 14, 1992

Lab No. 27253-3 Client ID: CP-HA-10-1.5-2

Semivolatile Organics Per EPA SW-846 Method 8270
Date Extracted: 9-23-92
Date Analyzed: 9-29-92

| CAS No. | Compounds | Concentration ug/kg | PQL |
|---|---|---|---|
| 108-95-2 | Phenol | ND | 28,000 |
| 111-44-4 | bis(2-Chloroethyl) ether | ND | 28,000 |
| 95-57-8 | 2-Chlorophenol | ND | 28,000 |
| 541-73-1 | 1,3-Dichlorobenzene | ND | 28,000 |
| 106-46-7 | 1,4-Dichlorobenzene | ND | 28,000 |
| 100-51-6 | Benzyl Alcohol | ND | 57,000 |
| 95-50-1 | 1,2-Dichlorobenzene | ND | 28,000 |
| 95-48-7 | 2-Methylphenol | ND | 28,000 |
| 39638-32-9 | bis(2-Chloroisopropyl)ether | ND | 28,000 |
| 106-44-5 | 4-Methylphenol | ND | 28,000 |
| 621-64-7 | N-Nitroso-Di-N-propylamine | ND | 28,000 |
| 67-72-1 | Hexachloroethane | ND | 28,000 |
| 98-95-3 | Nitrobenzene | ND | 28,000 |
| 78-59-1 | Isophorone | ND | 28,000 |
| 88-75-5 | 2-Nitrophenol | ND | 28,000 |
| 105-67-9 | 2,4-Dimethylphenol | ND | 28,000 |
| 65-85-0 | Benzoic Acid | ND | 140,000 |
| 111-91-1 | bis(2-Chloroethoxy)methane | ND | 28,000 |
| 120-83-2 | 2,4-Dichlorophenol | ND | 28,000 |
| 120-82-1 | 1,2,4-Trichlorobenzene | ND | 28,000 |
| 91-20-3 | Naphthalene | *(9,500) | 28,000 |
| 106-47-8 | 4-Chloroaniline | ND | 57,000 |
| 87-68-3 | Hexachlorobutadiene | ND | 28,000 |
| 59-50-7 | 4-Chloro-3-methylphenol | ND | 57,000 |

ND - Not Detected

Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992
Revised: October 14, 1992

Lab No. 27253-3 Client ID: CP-HA-10-1.5-2

EPA Method 8270 Continued

| CAS No. | Compounds | Concentration ug/kg | PQL |
|---|---|---|---|
| 91-57-6 | 2-Methylnaphthalene | ND | 28,000 |
| 77-47-4 | Hexachlorocyclopentadiene | ND | 28,000 |
| 88-06-2 | 2,4,6-Trichlorophenol | ND | 28,000 |
| 95-95-4 | 2,4,5-Trichlorophenol | ND | 28,000 |
| 91-58-7 | 2-Chloronaphthalene | ND | 28,000 |
| 88-74-4 | 2-Nitroaniline | ND | 140,000 |
| 131-11-3 | Dimethyl phthalate | ND | 28,000 |
| 208-96-8 | Acenaphthylene | ND | 28,000 |
| 606-20-2 | 2,6-Dinitrotoluene | ND | 28,000 |
| 99-09-2 | 3-Nitroaniline | ND | 140,000 |
| 83-32-9 | Acenaphthene | ND | 28,000 |
| 51-28-5 | 2,4-Dinitrophenol | ND | 140,000 |
| 100-02-7 | 4-Nitrophenol | ND | 140,000 |
| 132-64-9 | Dibenzofuran | ND | 28,000 |
| 121-14-2 | 2,4-Dinitrotoluene | ND | 28,000 |
| 84-66-2 | Diethylphthalate | ND | 28,000 |
| 7005-72-3 | 4-Chlorophenyl phenyl ether | ND | 28,000 |
| 86-73-7 | Fluorene | ND | 28,000 |
| 100-01-6 | 4-Nitroaniline | ND | 140,000 |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | ND | 140,000 |
| 86-30-6 | N-Nitrosodiphenylamine | ND | 28,000 |
| 101-55-3 | 4-Bromophenyl phenyl ether | ND | 28,000 |
| 118-74-1 | Hexachlorobenzene | ND | 28,000 |
| 87-86-5 | Pentachlorophenol | ND | 140,000 |
| 85-01-8 | Phenanthrene | *(4,800) | 28,000 |
| 120-12-7 | Anthracene | ND | 28,000 |
| 84-74-2 | Di-n-butylphthalate | ND | 28,000 |

ND - Not Detected

Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992
Revised: October 14, 1992

Lab No. 27253-3 Client ID: CP-HA-10-1.5-2

EPA Method 8270 Continued

| CAS No. | Compounds | Concentration ug/kg | PQL |
|---|---|---|---|
| 206-44-0 | Fluoranthene | ND | 28,000 |
| 129-00-0 | Pyrene | *(4,200) | 28,000 |
| 85-68-7 | Butyl benzyl phthalate | ND | 28,000 |
| 91-94-1 | 3,3'-Dichlorobenzidine | ND | 57,000 |
| 56-55-3 | Benzo(a)anthracene | ND | 28,000 |
| 218-01-9 | Chrysene | ND | 28,000 |
| 117-81-7 | bis(2-ethylhexyl)phthalate | ND | 28,000 |
| 117-84-0 | Di-n-octyl phthalate | ND | 28,000 |
| 205-99-2 | Benzo(b)fluoranthene | ND | 28,000 |
| 207-08-9 | Benzo(k)fluoranthene | ND | 28,000 |
| 50-32-8 | Benzo(a)pyrene | ND | 28,000 |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | ND | 28,000 |
| 53-70-3 | Dibenz(a,h)anthracene | ND | 28,000 |
| 191-24-2 | Benzo(g,h,i)perylene | ND | 28,000 |

ND - Not Detected
PQL - Practical Quantitation Limit - These are the quantitation limits for this sample. This number is based on sample size, matrix and dilution required.
*Compound was detected but below PQL. Value shown is an estimated quantity.
Results are reported on a dry weight basis.

Semi-Volatile Surrogates

| Surrogate Compound | Percent Recovery | Control Limits Water | Soil |
|---|---|---|---|
| Nitrobenzene - $d_5$ | X8 | 35 - 114 | 23 - 120 |
| 2-Fluorobiphenyl | X8 | 43 - 116 | 30 - 115 |
| p-Terphenyl-$d_{14}$ | X8 | 33 - 141 | 18 - 137 |
| Phenol-$d_6$ | X8 | 10 - 94 | 24 - 113 |
| 2-Fluorophenol | X8 | 21 - 100 | 25 - 121 |
| 2,4,6-Tribromophenol | X8 | 10 - 123 | 19 - 122 |

Continued . . . . .

# SOUND ANALYTICAL SERVICES, INC.

Burlington Environmental, Engineering
Project: 624878

Lab No. 27253
October 6, 1992
Revised: October 14, 1992

Lab No. 27253-3 Client ID: CP-HA-10-1.5-2

TPH Per EPA Method 418.1
Date Extracted: 9-23-92
Date Analyzed: 9-23-92

| | |
|---|---|
| Total Petroleum Hydrocarbons, mg/kg | 26,000 |

TPH Per EPA SW-846 Modified Method 8015
Date Extracted: 9-29-92
Date Analyzed: 9-29-92

| | | |
|---|---|---|
| Total Petroleum Fuel Hydrocarbons, mg/kg | 51,000 | E |

TPH as Aged Gas, Diesel and Heavy Oil

SURROGATE RECOVERY, %

| | |
|---|---|
| 1-Chlorooctane | X8 |
| O-Terphenyl | X8 |

SOUND ANALYTICAL SERVICES

DENNIS L. BEAN

# CHAIN OF CUSTODY

BURLINGTON
ENVIRONMENTAL

210 West Sand Bank Road
P.O. Box 330
Columbia, IL 62236-0330
618/281-7173
618/281-5120 FAX

# CHAIN-OF-CUSTODY RECORD

C.O.C. SERIAL NO. 6064

PROJECT NAME PIER 91
PROJECT NUMBER 604878 MAJOR TASK 7031
SAMPLERS J. PERLE
LAB DESTINATION SOUND ANALYTICAL

| SAMPLE NO. | DATE | TIME | COMP | GRAB | SAMPLE LOCATION | NO. OF CONTAINERS | TYPE OF ANALYSIS: RH SOLS | TPH 418.1 | BNA | | | | ICED | PRESERVATIVES: CHEMICALS ADDED | REMARKS (CHEMICAL ANALYSIS REQUEST FORM NUMBER IF APPLICABLE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 9-18 | 1315 | | X | CP-HA-8-3-3.5 | 1 | X | X | X | | | | X | | |
| | ↓ | 1325 | | X | CP-HA-8-4.5-5 | 1 | X | X | X | | | | X | | |
| | ↓ | 1115 | | X | CP-HA-10-4.5-2 | 1 | X | X | X | | | | X | | |

RELINQUISHED BY

| SIGNATURE | DATE | TIME |
|---|---|---|
| J. Perle | 9-21 | 1045 |
| J. Palmquist | 9/21 | 13:30 |

RECEIVED BY

| SIGNATURE | DATE | TIME |
|---|---|---|
| J.S. Palmquist | 9/21 | 16:45 |
| J. Siang SDS | 9/21/92 | 1230pm |

SHIPPING NOTES

LAB NOTES

BE-34 (1/92)